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United States Patent [19]

Yukinobu et al.

[11] **Patent Number:** 5,421,926[45] **Date of Patent:** Jun. 6, 1995[54] **TRANSPARENT CONDUCTIVE SUBSTRATE
AND METHOD OF MAKING THE SAME**[75] **Inventors:** Masaya Yukinobu; Munekazu
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Tsukui, Nasu, all of Japan[73] **Assignees:** Sumitomo Metal Mining Co., Ltd.;
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Ltd., both of Tokyo, Japan[21] **Appl. No.:** 184,695[22] **Filed:** Jan. 21, 1994**Related U.S. Application Data**[62] Division of Ser. No. 21,338, Feb. 23, 1993, Pat. No.
5,411,792.[30] **Foreign Application Priority Data**

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| Feb. 27, 1992 [JP] | Japan | 4-41275 |
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[51] **Int. Cl.⁶** B32B 31/00[52] **U.S. Cl.** 156/83; 156/89;
156/275.5; 156/344; 156/247; 156/497;
156/236; 156/240; 156/277[58] **Field of Search** 156/236, 240, 277, 230,
156/83, 497, 247, 344, 275.5, 89[56] **References Cited****U.S. PATENT DOCUMENTS**

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Primary Examiner—Chester T. Barry*Attorney, Agent, or Firm*—Graham & James[57] **ABSTRACT**

A transparent conductive substrate comprising a base plate member allowing transmission therethrough of visible light, a transparent, overcoat layer formed on the base plate member, and a transparent conductive film which is formed on the overcoat layer, containing ultra-fine particles of indium-tin oxide having a particle size of 0.1 μm or smaller, having light transmittance of 70% or higher and exhibiting surface resistance of 200 Ω/\square lower. This transparent conductive substrate has low surface resistance and excellent optical characteristics.

22 Claims, 4 Drawing Sheets